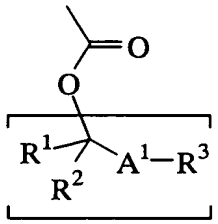
CLAIMS:

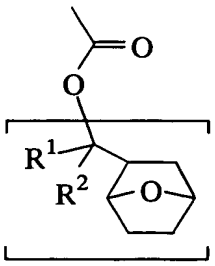
1. A polymer comprising recurring units containing silicon and recurring units having a substituent group of the general formula (1):



(1)

wherein $A^1$ is a divalent group selected from furandiyl, tetrahydrofurandiyl and oxanorbornanediyl, $R^1$ and $R^2$ are independently selected from straight, branched or cyclic monovalent hydrocarbon groups of 1 to 10 carbon atoms, or $R^1$ and $R^2$ taken together may form an aliphatic hydrocarbon ring with the carbon atom to which they are attached, and $R^3$ is hydrogen or a straight, branched or cyclic monovalent hydrocarbon group of 1 to 10 carbon atoms which may contain a hetero atom.

2. A polymer comprising recurring units containing silicon and recurring units having a substituent group of the general formula (2):

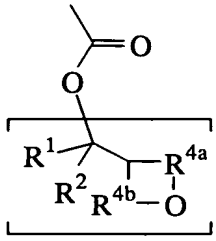


(2)

wherein $R^1$ and $R^2$ are independently selected from straight, branched or cyclic monovalent hydrocarbon groups of 1 to 10

carbon atoms, or $R^1$ and $R^2$ taken together may form an aliphatic hydrocarbon ring with the carbon atom to which they are attached.

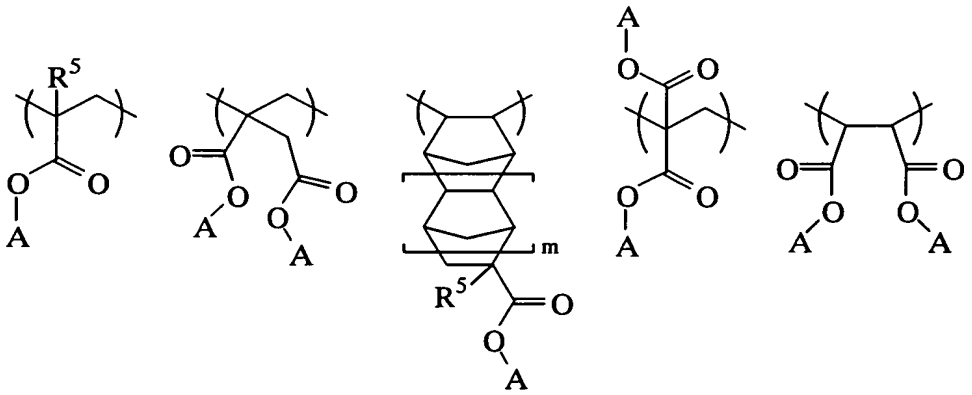
3. A polymer comprising recurring units containing silicon and recurring units having a substituent group of the general formula (3):



(3)

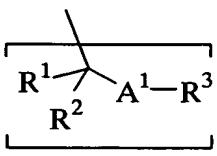
wherein $R^1$ and $R^2$ are independently selected from straight, branched or cyclic monovalent hydrocarbon groups of 1 to 10 carbon atoms, or $R^1$ and $R^2$ taken together may form an aliphatic hydrocarbon ring with the carbon atom to which they are attached, and $R^{4a}$ and $R^{4b}$ each are a single bond or an alkylene or alkenylene group of 1 to 4 carbon atoms, the total number of carbon atoms in $R^{4a}$ and $R^{4b}$ being from 3 to 6.

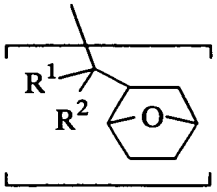
4. A polymer comprising recurring units containing silicon and recurring units of at least one type selected from the general formulae (4) to (8):

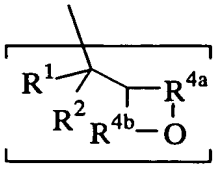


(4) (5) (6) (7) (8)

wherein $R^5$ is hydrogen or methyl, m is 0 or 1, A is a group selected from the following formulae (1a), (2a) and (3a), a plurality of A's may be the same or different,



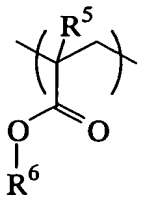




(1a) (2a) (3a)

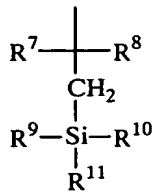
wherein $A^1$ is a divalent group selected from furandiyl, tetrahydrofurandiyl and oxanorbornanediyl, $R^1$ and $R^2$ are independently selected from straight, branched or cyclic monovalent hydrocarbon groups of 1 to 10 carbon atoms, or $R^1$ and $R^2$ taken together may form an aliphatic hydrocarbon ring with the carbon atom to which they are attached, and $R^3$ is hydrogen or a straight, branched or cyclic monovalent hydrocarbon group of 1 to 10 carbon atoms which may contain a hetero atom, and $R^{4a}$ and $R^{4b}$ each are a single bond or an alkylene or alkenylene group of 1 to 4 carbon atoms, the total number of carbon atoms in $R^{4a}$ and $R^{4b}$ being from 3 to 6.

5. The polymer of any one of claims 1 to 4 wherein the recurring units containing silicon have the general formula (9):

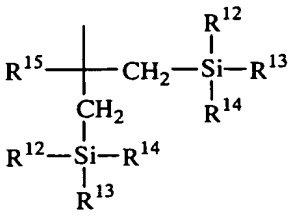


(9)

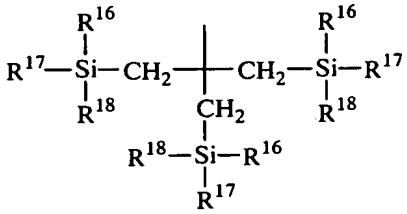
wherein $R^5$ is hydrogen or methyl, and $R^6$ is a silicon-containing group selected from the general formulae (10), (11), (12), (13), (14), (15) and (16):



(10)

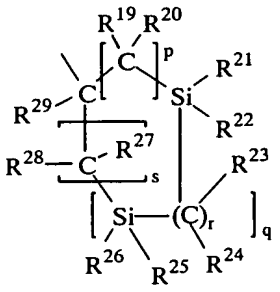


(11)

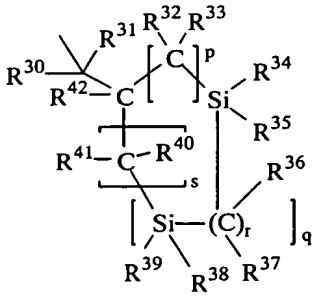


(12)

wherein each of $R^7$, $R^8$ and $R^{15}$ is hydrogen or a straight, branched or cyclic alkyl group of 1 to 10 carbon atoms, each of $R^9$, $R^{10}$, $R^{11}$, $R^{12}$, $R^{13}$, $R^{14}$, $R^{16}$, $R^{17}$ and $R^{18}$ is a straight, branched or cyclic alkyl group of 1 to 10 carbon atoms, an aryl group of 6 to 10 carbon atoms, a trialkylsilyl group, or a silicon-containing group which forms a siloxane or silalkylene bond with the silicon atom in each formula, or $R^7$ and $R^8$ taken together may form an aliphatic hydrocarbon ring of 3 to 10 carbon atoms with the carbon atom to which they are attached, a pair of $R^9$ and $R^{10}$, $R^9$ and $R^{11}$, $R^{10}$ and $R^{11}$, $R^{12}$ and $R^{13}$, $R^{12}$ and $R^{14}$, $R^{13}$ and $R^{14}$, $R^{16}$ and $R^{17}$, $R^{16}$ and $R^{18}$, and $R^{17}$ and $R^{18}$, taken together, may form a polysiloxane ring of 3 to 10 silicon atoms with the silicon atom to which they are attached,



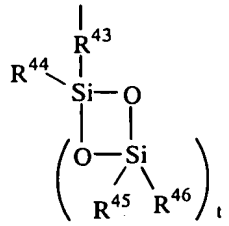
(13)



(14)

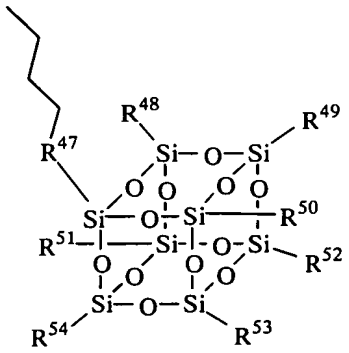
wherein each of $R^{29}$, $R^{30}$ and $R^{31}$ is a straight, branched or cyclic alkyl group of 1 to 20 carbon atoms, each of $R^{19}$, $R^{20}$, $R^{23}$, $R^{24}$, $R^{27}$, $R^{28}$, $R^{32}$, $R^{33}$, $R^{36}$, $R^{37}$, $R^{40}$, $R^{41}$ and $R^{42}$ is hydrogen or a straight, branched or cyclic alkyl group of 1 to 20 carbon atoms, each of $R^{21}$, $R^{22}$, $R^{25}$, $R^{26}$, $R^{34}$, $R^{35}$, $R^{38}$ and $R^{39}$ is

hydrogen, a straight, branched or cyclic alkyl group of 1 to 20 carbon atoms, a straight, branched or cyclic fluorinated alkyl group of 1 to 20 carbon atoms, or an aryl group of 6 to 20 carbon atoms, p, q, r and s each are an integer of 0 to 10, satisfying $1 \leq p+q+s \leq 20$,

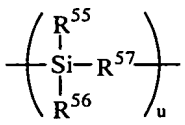


(15)

wherein $R^{43}$ is an alkylene group of 2 to 4 carbon atoms, each of $R^{44}$, $R^{45}$ and $R^{46}$ is a straight, branched or cyclic alkyl group of 1 to 10 carbon atoms or an aryl group of 6 to 10 carbon atoms, t is an integer of 2 to 10,



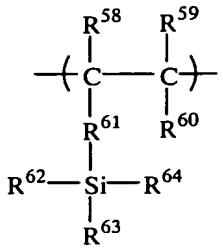
(16)



(17)

wherein each of $R^{48}$ to $R^{54}$ is independently hydrogen or a straight, branched or cyclic alkyl or fluorinated alkyl group of 1 to 10 carbon atoms, which may contain an ether, lactone, ester, hydroxy or cyano group, $R^{47}$ is a single bond or a linking group of formula (17), $R^{55}$ and $R^{56}$ each are a straight, branched or cyclic alkyl group of 1 to 10 carbon atoms, $R^{57}$ is a single bond, an oxygen atom or an alkylene group of 1 to 4 carbon atoms, and u is an integer of 1 to 20.

6. The polymer of any one of claims 1 to 4 wherein the recurring units containing silicon have the general formula (18):



(18)

wherein each of $R^{58}$, $R^{59}$ and $R^{60}$ is hydrogen or a straight, branched or cyclic alkyl group of 1 to 10 carbon atoms, $R^{61}$ is a single bond or a straight, branched or cyclic alkylene group of 1 to 10 carbon atoms, each of $R^{62}$, $R^{63}$ and $R^{64}$ is independently a straight, branched or cyclic alkyl or halo-alkyl group of 1 to 20 carbon atoms, an aryl group of 6 to 20 carbon atoms, a trialkylsilyl group, or a silicon-containing group which forms a siloxane or silalkylene bond with the silicon atom in each formula, or $R^{62}$ and $R^{63}$, $R^{62}$ and $R^{64}$, or $R^{63}$ and $R^{64}$, taken together, may form a polysiloxane ring with the silicon atom to which they are attached.

7. A resist composition comprising the polymer as set forth in any one of claims 1 to 6.

8. A chemically amplified positive resist composition comprising

(A) the polymer as set forth in any one of claims 1 to 6,

(B) a photoacid generator, and

(C) an organic solvent.

9. A chemically amplified positive resist composition comprising

(A) the polymer as set forth in any one of claims 1 to 6,

(B) a photoacid generator,

(C) an organic solvent, and

(D) a dissolution inhibitor.

10. The chemically amplified positive resist composition of claim 8 or 9, further comprising (E) a basic compound.

11. A process for forming a resist pattern comprising the steps of:

(i) applying the chemically amplified positive resist composition of any one of claims 7 to 10 onto a substrate to form a coating,

(ii) heat treating the coating and then exposing it to high energy radiation having a wavelength of up to 300 nm or electron beam through a photomask, and

(iii) optionally heat treating the exposed coating and developing it with a developer to form a resist pattern.

12. The pattern forming process of claim 11 wherein the substrate bears thereon an underlay on which the coating of the resist composition is formed, said process further comprising the step of treating the underlay by an etching process including oxygen plasma etching, after the resist pattern formation.

13. The pattern forming process of claim 11 wherein the substrate bears thereon an underlay on which the coating of the resist composition is formed, said process further comprising the step of treating the underlay by etching with a halogen gas containing chlorine or bromine, after the resist pattern formation.